WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a substrate;

a ferroelectric capacitor including a ferroelectric film on the substrate; and

a stress application layer which actively applies tensile or compressive stress to the ferroelectric film of the ferroelectric capacitor by deforming the substrate.

2. The semiconductor device of claim 1 wherein the stress application layer is provided on a surface of the substrate.

3. The semiconductor device of claim 2 wherein the stress application layer contains a film formed on the substrate surface, said film having a thickness in a range of 1 micrometers to 5 micrometers, and having a coefficient of thermal expansion different from a coefficient of thermal expansion of the substrate.

4. A semiconductor device comprising:

a semiconductor substrate;

gate electrodes and diffusion regions formed on the substrate;

ferroelectric capacitors each including a lower electrode

layer, a ferroelectric film and an upper electrode layer, which are stacked over the substrate sequentially and connected to the diffusion regions; and

a stress application layer applying tensile or compressive stress to the ferroelectric film of the ferroelectric capacitor, wherein the stress application layer contains a film formed on a back surface of the substrate, said film having a thickness in a range of 1 micrometers to 5 micrometers, and having a coefficient of thermal expansion different from a coefficient of thermal expansion of the substrate.

5. A semiconductor device comprising:

an IC chip including a semiconductor substrate and a ferroelectric capacitor, the ferroelectric capacitor including a lower electrode layer, a ferroelectric film and an upper electrode layer which are stacked over the substrate sequentially;

a die pad supporting the IC chip; and

a die attachment layer attaching the IC chip to the die pad,

wherein one of the die attachment layer and the die pad is provided to apply tensile or compressive stress to the IC chip.

6. The semiconductor device of claim 5 wherein the die attachment layer is composed of a thermosetting resin, and the thermosetting resin of the die attachment layer is contracted at a time of curing so that the die attachment layer acts to apply tensile stress to the ferroelectric film of the IC chip.

7. The semiconductor device of claim 5 wherein the die

pad is composed of a bimetallic strip containing metal materials with different coefficients of thermal expansion, so that the die pad is provided to apply tensile or compressive stress to the ferroelectric film of the IC chip.

8. The semiconductor device of claim 1 wherein the ferroelectric film contains an oxide which has one of a perovskite crystal structure, a stratified or layered perovskite crystal structure, or a tungsten-bronze crystal structure.

9. The semiconductor device of claim 8 wherein the perovskite crystal structure of the oxide includes one of $Pb(Zr_{1-x}Ti_x)O_3$ ($0 \leqq x \leqq 1$), $(Pb_{1-y}La_y)(Zr_{1-x}Ti_x)O_3$ ($0 \leqq x, y \leqq 1$), $Ba(Sr_{1-x}Ti_x)O_3$ ($0 \leqq x \leqq 1$), or $BiLaTiO_z$.

10. A manufacture method of a semiconductor device including a semiconductor substrate and a ferroelectric capacitor, the ferroelectric capacitor including a lower electrode layer, a ferroelectric film and an upper electrode layer which are stacked over the substrate sequentially, the method comprising steps of:

forming the ferroelectric film;

applying external force to the semiconductor device after the ferroelectric film is formed; and

controlling a direction of polarization of the ferroelectric film by the application of an external mechanical force.

11. A manufacture method of a semiconductor device, comprising steps of:

forming an IC chip so that the IC chip includes a semiconductor substrate and a ferroelectric capacitor, the ferroelectric capacitor including a lower electrode layer, a ferroelectric film and an upper electrode layer which are stacked over the substrate sequentially;

attaching the IC chip to a die pad by using a die attachment agent; and

applying external force to the IC chip in said attaching step.

12. A measurement fixture for a ferroelectric film formed on a substrate of a semiconductor device, comprising:

a fixing part fixing one end of the substrate such that the substrate is arranged horizontally to place the ferroelectric film on the substrate upside;

a moving part movably supporting the other end of the substrate such that the substrate is movable vertically; and

a micrometer head moving vertically the other end of the substrate where it is supported by the moving part, in a controlled quantity.

13. A method of measuring electrical characteristics of a ferroelectric film of a ferroelectric capacitor, the method comprising steps of:

applying an external electric field to the ferroelectric film of the ferroelectric capacitor;

applying a predetermined stress to the ferroelectric film when the electric field is applied to the ferroelectric film; and

detecting a signal indicating expansion or contraction of

the ferroelectric film according to the stress applied to the ferroelectric film.